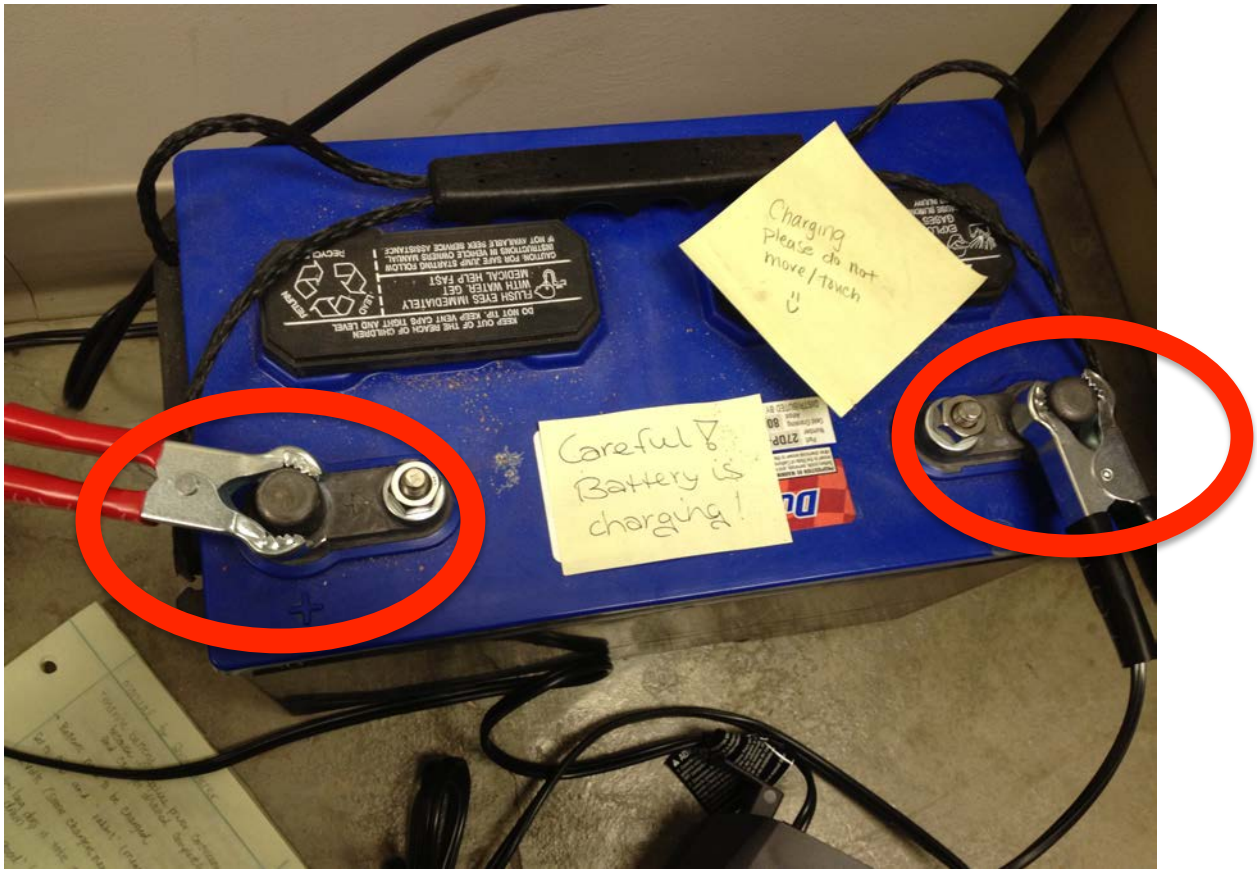
Guralp Seismometer Installation

Charging the Batteries

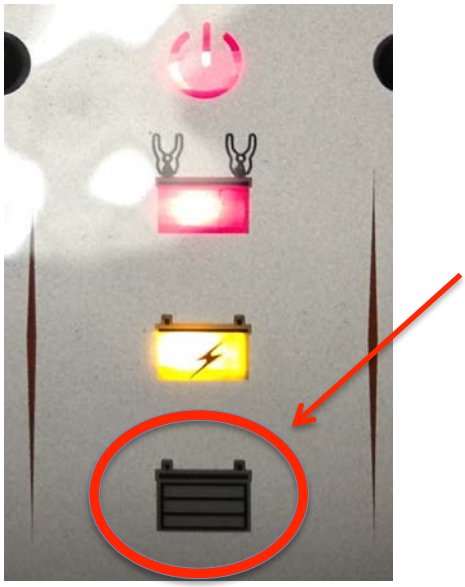
The seismometers use a 12 volt marine battery, used because it is able to supply power continuously and can be drained completely—therefore, the batteries will need to be charged every now and then. Note that on full charge, they should last several weeks on a regular deployment.

1. Plug the charger into the wall and make sure it is set to STD, and make sure that it is set to "fast charging" (the picture of the rabbit)

2. Once the charger is plugged in, you can connect the clamps to the battery that you wish to charge. Connect the Positive (+) knob on the battery to the Positive (+) clamp from the charger, and connect the negative (-) knob on the battery to the negative (-) clamp from the charger. **The positive is RED the negative is BLACK.**



3. When the battery is fully charged, the bottom light will be lit up



This will light up when fully charged!!

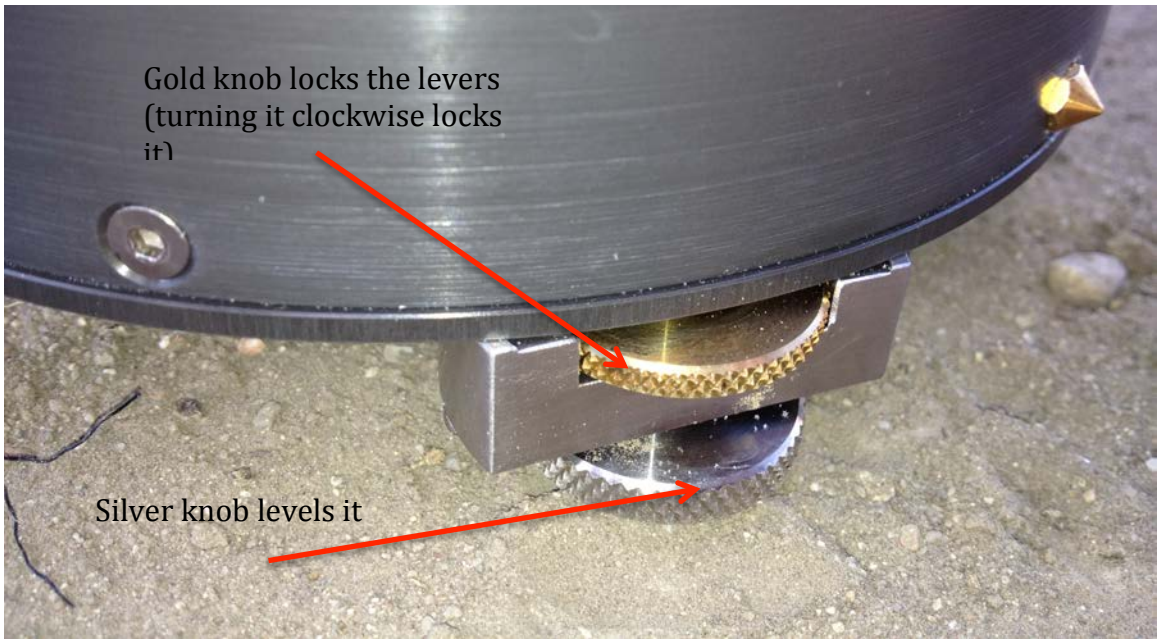
A few things to note: When working, the charger will start to make a sound (like a fan). Also, you should charge the batteries in a well-ventilated room!!! Battery releases some gas that may be hazardous- **Do not charge in a small enclosed area**.

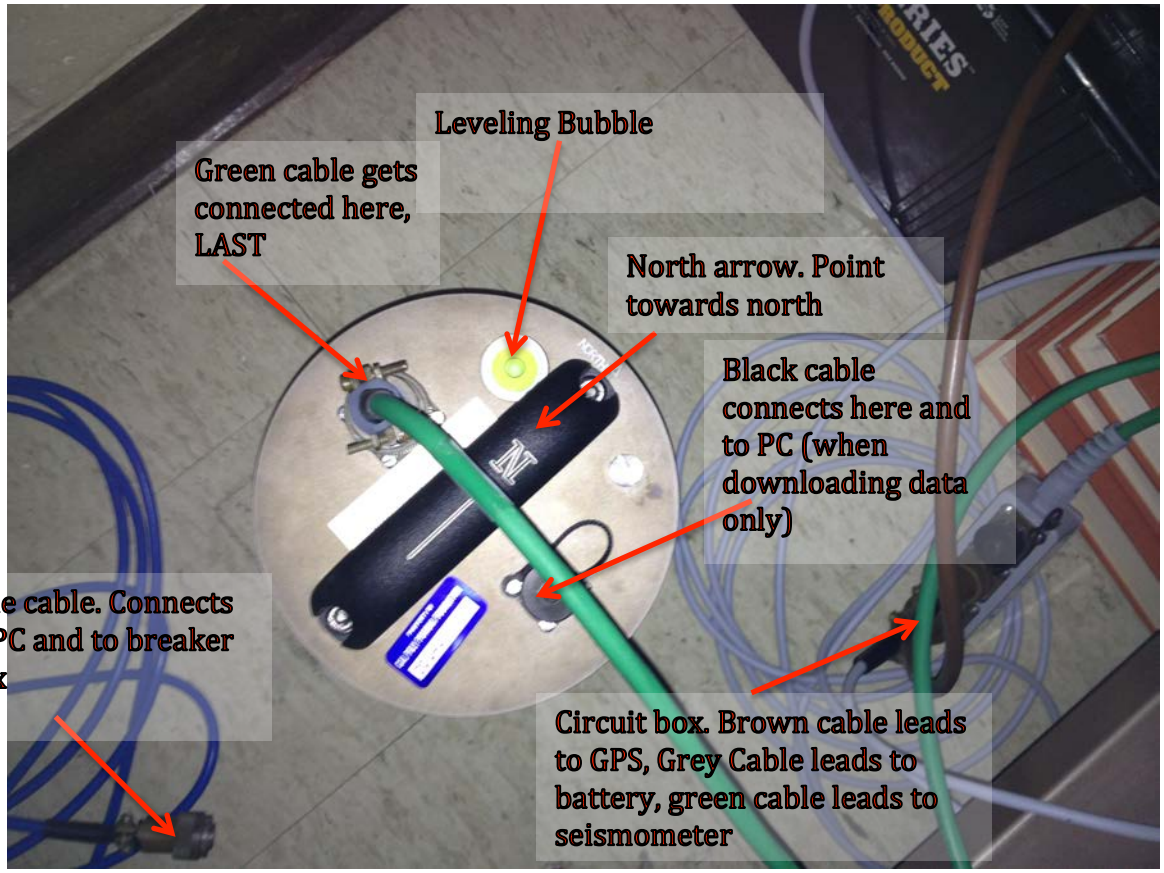
Setting up the seismometer

Once you have a charged battery, and have found a location for the placement, the seismometer is ready for installation. Find a relatively flat surface that the seismometer won't sink into. You can bring a tile or other flat object to act as a surface, but make sure it is not free to move. Make sure to find a good spot for the GPS as well, with an unobstructed view of a large section of the sky.

First, the seismometer needs to be pointing towards North. Find North with a compass and orient the arrow on the top of the seismometer towards North.

Once it is pointing North, you must level the seismometer. There is a green level bubble on the top of the device. Level it with the copper knobs at the base of the seismometer.

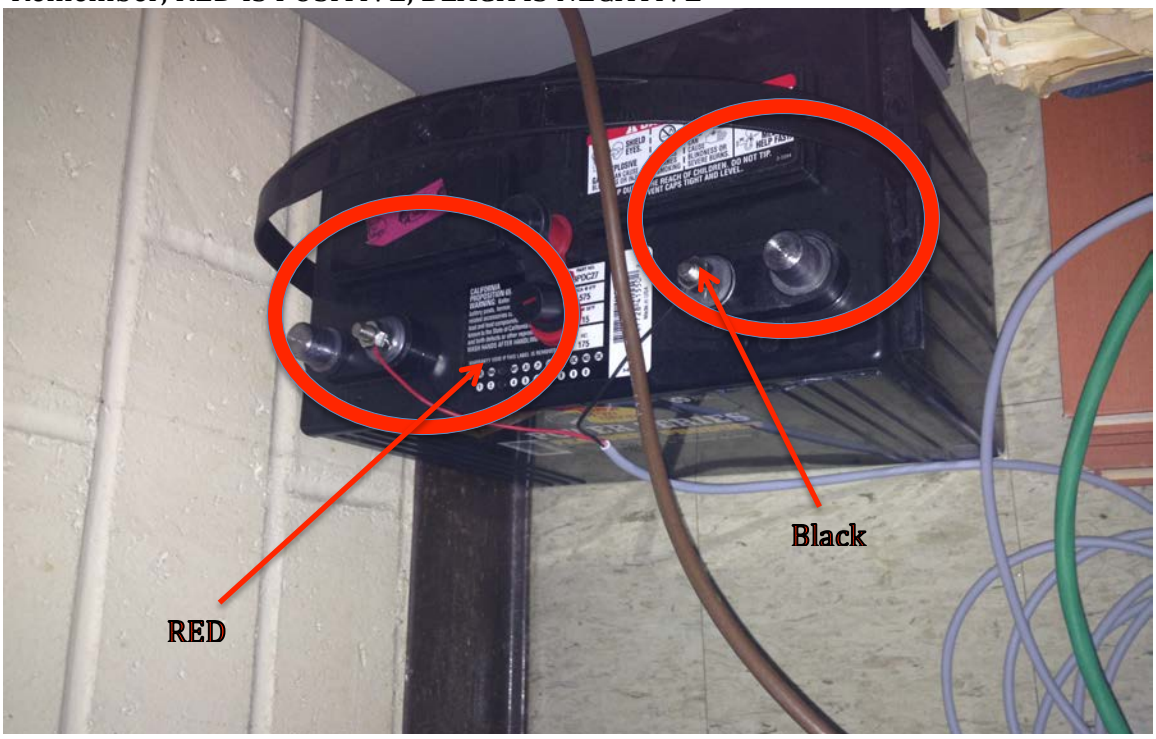




note some seismometers do not have colored cables. ID which cable is which by the connection at the end

1. First, connect the (brown) GPS cable to the circuit box. The circuit box has a connection labeled "GPS". For non-colored cables: the GPS cable is very long and can be matched by finding the partner to the connection on the breakout box.
2. The blue cable gets connected to the PC. For a non-blue cable, it will have the pin connection at one end and a square pin computer port connection on the other. Plug one end into the PC and the other end gets plugged into the breakout box. Only if you use the little screws (and make sure you bring a screwdriver in that case or else you won't be able to remove the cable from the PC again!) will it fit tight with the PC. Otherwise, be careful to not move the PC around and have the cable fall out.
3. The grey cable with red and black wires is for the battery. Connect the 10-pin plug on the breakout box and connect the wires at the other end to the battery. Remember, RED IS POSITIVE, BLACK IS NEGATIVE.

Remember, RED IS POSITIVE, BLACK IS NEGATIVE

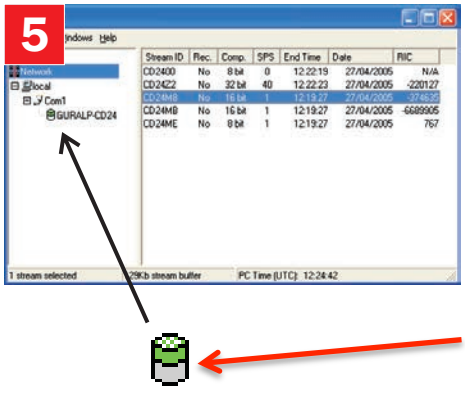


4. And finally, connect the green cable from the circuit box to the seismometer. DO THIS STEP LAST!!!
5. There may be a cable "left over". This cable is to connect the disk (later).
6. When packing up, remove the cables in opposite order (start with the cable to the seismometer).

Setup with the PC

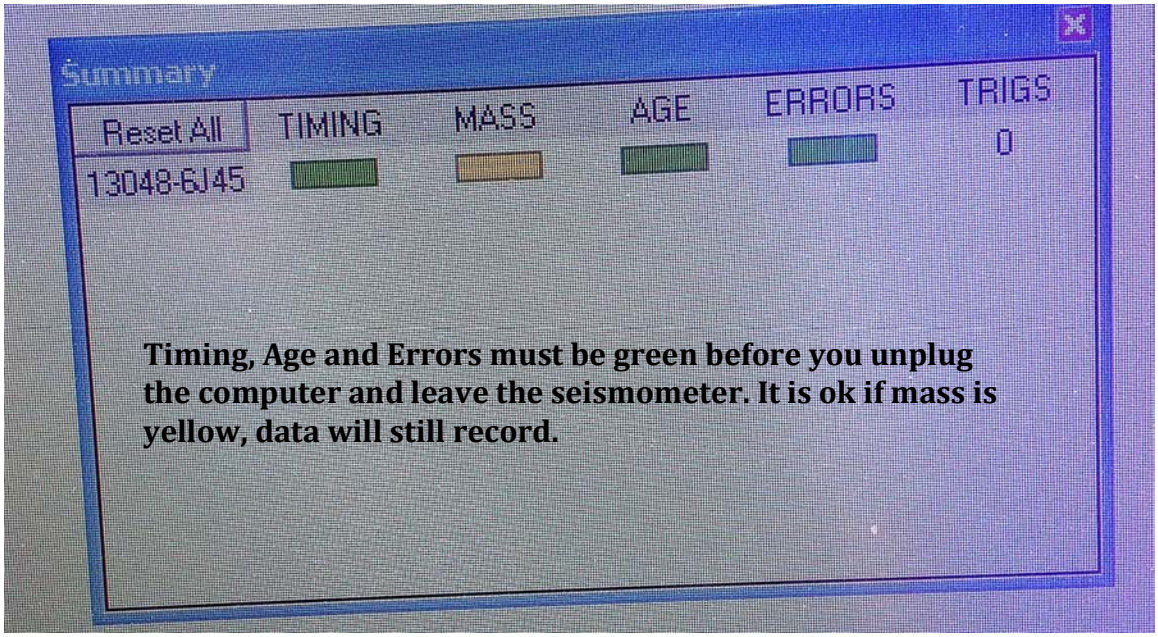
Once all of the cables are connected, a PC program will tell you if the seismometer is connected properly and is ready to run. The laptop's password is seismic.

1. Run the Scream! Software on the computer's desktop. (Make sure not to run the installer for Scream instead, which may also be on the desktop.)
2. Data channels will start to show in the main window, on the right hand side.



This icon will turn green when ready. It will show in the left hand side of the screen and will have the serial number next to it

3. In the display screen there will be various channels listed (under Com 1). Definitely the Z, N, and E of ground motion, possibly the mass position (8, 9 and M) and the satellite (00) channel (the latter ones may only appear later).
4. Double click on the Z channel, to display the waveform. Tap next to(!) the seismometer and check that a signal shows up after a short delay.
5. Double click on the "00" channel, if it shows up in the channel list; this is the GPS channel. **Always wait until the 00 channel appears before assuming the seismometer has been set up and is working**. It may take up to 40 minutes. The GPS channel is essential for proper timing. You may work on items 6,7 and 8 while you are waiting for this channel to appear.
6. Click on file—click setup and make sure the device is set to "Baud Rate 19200".
7. Right click on the icon of the seismometer (see image in 2.) —click control—click on the "data flow" tab and check that the device is set to "duplicate" and "reuse"; this will assure the data flow is continuous.
8. Click on "window"—click "summary" and you will get a summary window displaying timing, mass, age and error.



9. Mass means that the seismometer is level and should be green (but usually is yellow and that is OK; however a red indicator would need to be fixed by slowly re-leveling and waiting for updates on the mass position channel). Age means that the data that is being received is current, and should be green. Note that time is in GMT time. Timing may be yellow if the GPS does not (yet) see sufficient satellites for proper timing.
10. Make note of lat/long from the "00" channel window, if this information is available (it may not be).
11. Once everything is green (or only mass is yellow), the seismometer will record data. It is now ok to unplug the blue cable to the PC (on either end).

Before you leave the site

1. Make sure you WRITE DOWN the serial number! And lat/lon.

2. Take a few pictures of the site, so you can identify it for an eventual later deployment in the exact same spot.

Retrieving the data

1. Circuit box should be connected to the seismometer
2. Connect the blue cable from the laptop to the breaker box
3. Connect the seismometer to the disk
4. Connect the power cable from disk to PC (not the other little cable on the disk, only the power cable)
5. Click and open SCREAM software (note: not the installer!)
6. Right click on the icon for the seismometer and choose to open terminal
7. Typing "flush" into terminal will give all the data since the last time you flushed
8. You should get "transfer finished" when done, and the window will ask to be closed (this could take a long time, depending on the data transfer)
9. Close the window
10. Typing "flush all" flushes all the data on the seismometer (LOTS of data)

Always keep the two short cables attached to the disk; do not separate them to avoid losing or misplacing them.

Transferring data from disk to laptop

1. (Disconnect the seismometer from the disk)
2. Connect the power cable and the other little cable from the disk to the PC
3. Open GCFxtract
4. Data folders and their sizes are shown in the drop down menu (most recent ones at the bottom, you may need to scroll down!)
5. Click Scan
6. This will give you channels, click select all
7. Create a target Folder with your name on it on the Desktop
8. Output SAC (Intel), 1 day duration, 24 hours
9. Extract
10. Folder for every channel should appear in the target Folder
11. If you want to make sure that the disk will not fill up next time and are fine with the data on the disk being overwritten in next use, hit Reset
12. Download your data from the folder on the Toughbook and delete that folder from the Toughbook to prevent cluttering (files get erased from the Toughbooks on a regular basis, don't count on them being there next time!)

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